

# EFFECTS OF VARIATIONS IN GIN AND MILL CLEANING ON THE LINT AND YARN QUALITY OF MECHANICALLY PICKED AND STRIPPED COTTONS

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## INTRODUCTION

In 1982, the Putnam Soil and Water Conservation District (SWCD), in cooperation with the USDA, Soil Conservation Service (SCS) took part in the National Resources Inventory (NRI). In Putnam County, information was collected on over 200 random sample sites, with each site representing 160 acres. This random sampling provided reliable information on the resource base of Putnam County.

This inventory provided natural resource data on (1) land use, (2) prime farmland, (3) flood prone areas, (4) soil erosion, and (5) conservation treatment needs.

The study provided information to identify erosion and land management problems in Putnam County. These problems were addressed and priorities set in the District's long-range program. Top priorities include: (1) the reduction of sheet, rill, and gully erosion, (2) the reduction of flood damages in both rural and urban areas, (3) the improvement of drainage on agricultural land, and (4) the improvement of water quality through programs to reduce erosion and to encourage proper management of fertilizers and pesticides.

This publication distributes the results of the Putnam County Resources Inventory. It describes the soil resource base and highlights some problems that could reduce future soil productivity. Landowners, interested groups, and government agencies can use this information to develop programs and policies to protect the resource base.

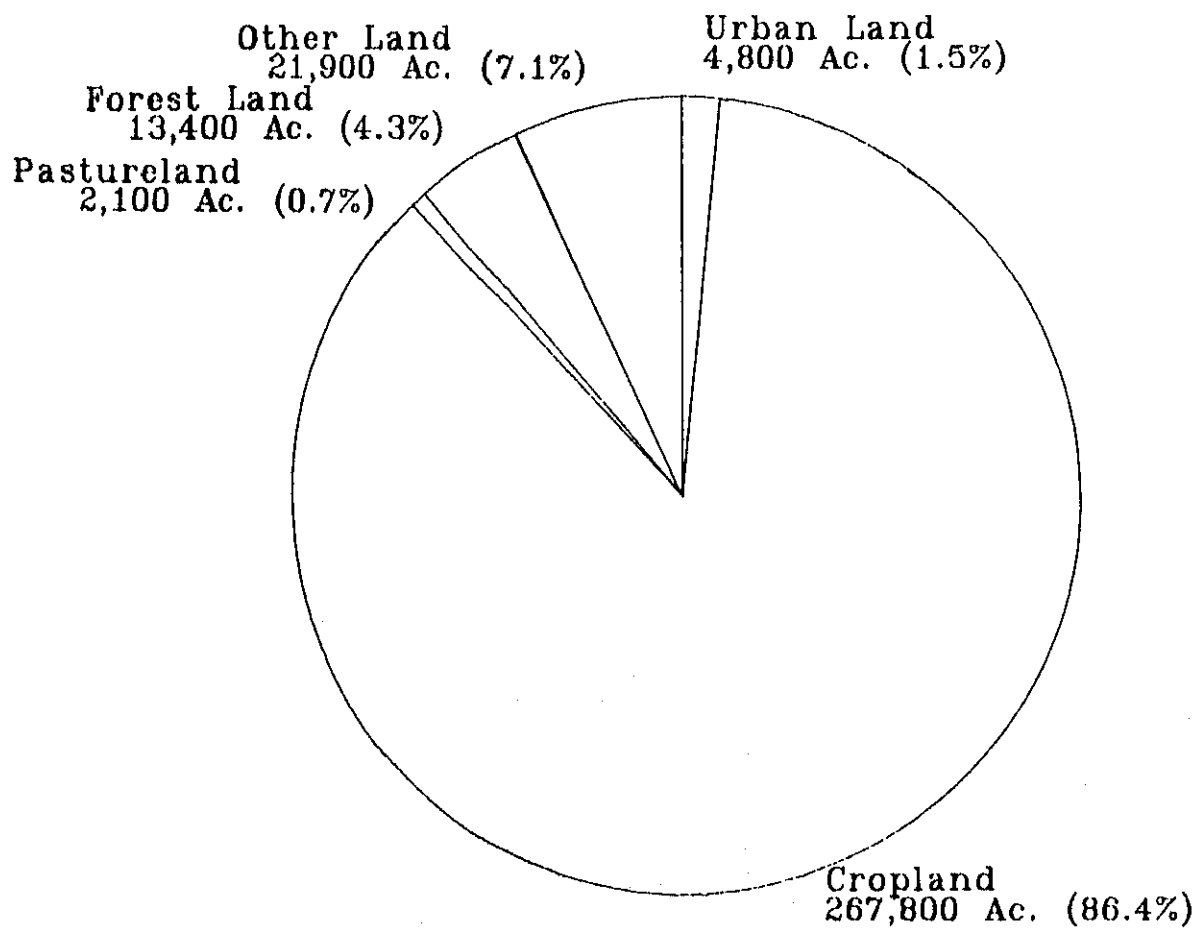
The information in this publication, like all information developed from a statistical study, has varying degrees of reliability or confidence levels. All values expressed here, representing over 10 percent of the county area, have a confidence level greater than 90 percent or they are at least 90 percent accurate. Smaller values, those representing less than 10 percent of the total county area, will be less than 90 percent accurate.

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## Land Use

Land use categories are shown in Figure 1 with the acres and percent of total land area. Urban land is defined as land used for residences, industrial, commercial, and institutional sites, etc. Agricultural land in the county includes cropland, pastureland, and forest land. Other rural land includes farm homesteads, feedlots, farm lanes, drainage ditches, and other minor uses.

Figure 1. Putnam County Land Use



TOTAL ACREAGE OF PUTNAM COUNTY = 310,000 ACRES

### Land Use by Capability Class

Soils can be classified in a number of ways. SCS uses a land capability classification system that groups soils on the basis of their ability to produce common cultivated crops and pasture plants without deterioration. Land capability classes and subclasses in Putnam County are based on the soil survey.

Capability classes are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of agricultural use.

Class III soils have severe limitations that reduce the choice of agricultural use.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Each capability class except Class I has subclasses to identify specific limitations. The letter "e" stands for erosion risk; "w" for wetness; and "s" for soils limited mainly because they are shallow, droughty, or stony.

Table 1. Rural Land Use Acreage by Capability Class

CLASS	CROPLAND Acres	PASTURELAND Acres	FOREST LAND Acres	OTHER RURAL LAND Acres	TOTAL
II	147,100	1,800	5,800	4,100	157,000
III	120,700	0	7,200	4,200	133,900
IV	0	0	400	0	400
VI	0	300	0	0	300
NA	0	0	0	4,500	4,500
TOTAL	267,800	2,100	13,400	12,800	296,100

KEY POINTS:

- o More than 98 percent of all agricultural land is either Class II or III.
- o All cropland is located on Classes II and III.

Table 2. Cropland by Capability Class and Subclass

CLASS	SUBCLASS "e" (Erosion) Acres	SUBCLASS "w" (Wetness) Acres	SUBCLASS "s" (Shallow, droughty or stony) Acres	TOTAL Acres
II	13,200	133,600	300	147,100
III	4,500	115,500	700	120,700
TOTAL	17,700	249,100	1,000	267,800

KEY POINT:

- o The major limitation on 93 percent of all cropland is poor natural drainage (wetness).

### Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short and long range needs for food and fiber. Prime farmland soils are defined as the soils that are best suited to producing food, fiber, forage, feed, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland is also the easiest and least costly to develop for non-agricultural uses. Urbanization and other land uses have the potential to consume significant areas of prime farmland. Decisions need to be made at the local level to encourage wise use of agricultural lands.

Table 3. Prime Farmland by Rural Land Use

LAND USE	TOTAL ACRES	PRIME FARMLAND	
		Acres	Percent
Cropland	267,800	204,900	77
Pastureland	2,100	700	33
Forest Land	13,400	8,200	61
Other Land	12,800	5,500	43
TOTAL	296,100	219,300	74

#### KEY POINTS:

- o Seventy-four percent of all agricultural land in Putnam County is rated as prime farmland.
- o Ninety-three percent of all prime farmland is currently in cropland.

### Flood Prone Areas

A number of large streams and rivers flow through the county. Flood prone areas exist next to these streams and rivers. There are 12,500 acres of rural land subject to flooding. About three percent of the total cropland in the county is within the flood prone area. Sixty-three percent of this area is now cropland.

## Soil Erosion

Soil erosion is a continuously occurring natural process that loosens and transports soil particles. Erosion occurs slowly on undisturbed forest land and areas with adequate permanent vegetative cover. Soil losses are quite high on sloping cropland that is continually cultivated and left unprotected during several months every year.

The quantity of soil erosion on pastureland and forest land in Putnam County is negligible. Only a small portion of land is in those uses and most of it has adequate vegetative cover. Almost 100 percent of all the soil erosion in the county is on cropland.

The following table shows the total annual soil loss for cropland in the county.

Table 4. Erosion on Cropland by Capability Class and Subclass

CLASS AND SUBCLASS	ACRES	TONS	TONS/ACRE
IIe	13,200	72,400	5.5
IIw	133,600	303,800	2.3
IIIe	4,500	27,700	6.2
IIIw	115,500	237,300	2.1
All Others	1,000	5,300	5.3
TOTAL	267,800	646,500	
AVERAGE			2.4

### KEY POINTS:

- o Fifteen percent of all cropland erosion (tons) is on Class IIe and IIIe soils.
- o Eighty-four percent of all cropland erosion (tons) is on IIw and IIIw soils (those with wetness problems).

Soil can tolerate small amounts of erosion and remain productive for agriculture. When erosion is above this tolerable limit, the soil resource base cannot be maintained and the future ability of the soil to produce crops is threatened. The tolerable soil loss ("T") ranges from three to five tons per acre per year, with most of the soils in Putnam County having a "T" of five.

The county contains 33,800 acres of cropland eroding at rates greater than "T". Over 5,000 of these acres are eroding at rates greater than two times "T". These acres represent a serious threat to the productive capacity of Putnam County. Most of the cropland on nearly level slopes is eroding less than "T". Eighty-six percent of all land that is gently sloping or sloping is eroding at rates higher than "T".

Table 5. Cropland in Relation to "T"  
by Capability Class and Subclass

CAPABILITY CLASS	TOTAL	LESS THAN "T"	"T" - "2T"	GREATER THAN "2T"
-----ACRES-----				
IIE	13,200	2,400	7,300	3,500
IIW	133,600	126,600	6,700	300
IIIe	4,500	0	3,800	700
IIIW	115,500	104,600	10,600	300
All Others	1,000	400	300	300
TOTAL	267,800	234,000	28,700	5,100

#### KEY POINTS:

- o Thirteen percent of all cropland is eroding over "T".
- o Eighty-six percent of all cropland on IIE and IIIe land is eroding over "T".
- o Twenty-four percent of all cropland on IIE and IIIe land is eroding over "2T".

Soil erosion has a harmful impact on water quality. Even though the erosion rate may not be enough to affect soil productivity, the amount of sediment leaving the land could have an adverse effect on the water quality of streams in the area. A significant reduction in the 646,500 tons of erosion annually would have other benefits. An example of this would be a reduction of the maintenance of open drainage ditches, and a reduction of sediment with attached phosphorous being delivered into Lake Erie.



## Conservation Treatment Needs

Many acres of Putnam County agricultural land need one or more different types of conservation treatment to either protect or improve soil and water resources. The different conservation practices used to accomplish these objectives vary by land use.

Cropland is considered adequately treated when soil erosion is at or below the tolerable level and the drainage needs are met. Acres needing additional treatment are divided into those needing soil erosion control as the primary treatment and those acres needing additional drainage improvements.

Conservation treatment needs on cropland: (1) 152,300 acres (57 percent) of Putnam County cropland is considered adequately protected, (2) 33,800 acres (13 percent) of Putnam County cropland need erosion control measures as their primary treatment, and (3) 115,500 acres (35 percent) of Putnam County cropland need drainage improvements, either surface or subsurface, as their primary treatment.

Cropland treatment for control of sheet and rill erosion usually involves agronomy practices such as conservation cropping systems or conservation tillage. Components of these systems may include adding small grains or meadow to the crop rotation, a complete no-till system or a reduced till system. Reduced till might involve chisel plowing, ridge tilling, or disking instead of fall plowing. It could also be something as simple as spring plowing instead of fall plowing.

Cropland treatment for control of gully erosion usually involves engineering type practices such as grass waterways, concrete drop box structures, tile outlet pipes, rock chute drop structures, or water and sediment control basins.

Drainage improvements may involve subsurface tile drainage or surface drainage improvements, examples of which are: cleaning of deep open ditches or shaping of drainage field ditches.

Even though the largest land use in the county is cropland, there are 13,100 acres of forest land and 1,000 acres of pastureland needing conservation treatment. Conservation practices used for treatment of forest land may include live-stock exclusion, tree planting, or timber stand improvement. Conservation practices used for treatment of pastureland include rotational grazing, pasture management, or pasture improvement.

## SUMMARY

Agriculture accounts for over 90 percent of the land use of Putnam County with cropland accounting for 86 percent.

About 74 percent of the rural land in the county is prime farmland with the majority in cropland use.

About four percent of the rural land in the county is classified as flood prone. Again, the majority is in cropland.

Serious erosion problems exist on 13 percent of all the cropland in the county. If erosion is allowed to continue at the present high rates, productivity will be reduced.

Drainage improvements are needed on 35 percent of Putnam County cropland for the land to reach its full production potential.

Pastureland and forest land together account for only five percent of the agricultural land in the county. However, 90 percent of these acres need additional conservation treatment.

Some type of conservation treatment is needed on 46 percent of all Putnam County agricultural land.